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Development and Validation of Instruments for Evaluation of the Clinical Medicine Curriculum in Terms of Social Accountability

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Abstract

Background & Objective: Medical graduates must acquire the necessary competencies to address the needs of the community during their studies. This requires the evaluation, modification, and quality improvement of the curriculum. The present study aimed to develop a valid and reliable instrument for the evaluation of the curriculum of clinical medicine in terms of social accountability.

Materials and Methods: This combined study was conducted in three stages at Tabriz University of Medical Sciences, Iran in 2015. In the first stage, qualitative content analysis and features of the curriculum of clinical medicine were determined based on the social accountability approach. In the second stage, the dimensions and items of the instrument were codified using the results of the qualitative stage of the study and by reviewing credible manuscripts relevant to the research subject. In the third stage, the face validity, content validity, and reliability of the instrument were assessed.

Results: In the first stage of the study, features of the curriculum of clinical medicine were determined based on social accountability. In the second stage, the initial instrument was developed with 4 dimensions and 55 items. In the third stage, the instrument was validated with 40 items. The effects score of the items was <1.5, and the CVR and CVI of each item were <0.59 and <0.79, respectively. In addition, the reliability of the instrument was confirmed at the Cronbach's alpha of 0.97.

Conclusion: The evaluation instrument was developed with 4 dimensions and 40 items, which had good content validity, face validity, and reliability. Therefore, the instrument could be used for the evaluation of the curriculum of clinical medicine in terms of social accountability.

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Introduction

Social accountability and commitment are one of the philosophical approaches in academic education, which mainly focus on the accountability of universities in providing community services. In this approach, medical schools and universities are considered as social institutions based on addressing the needs and expectations of the community, which is inherent to academic education (1). In other words, medical universities must be socially accountable and grant variable degrees of social accountability in the community (2).

Ever since medical education has become community-oriented and holistic, special attention has been paid to the concept of social accountability on behalf of medical education (3). Accountable medical education encompasses a curriculum that is based on receiving and responding to the health needs of the community, as well as preparing students for the provision of healthcare services (4).

Social accountability of curriculum involves the orientation of medical education activities toward the training of physicians who are able to meet the health needs of the community (5). In recent decades, this concept has attracted the attention of researchers, so that Medical Teacher (an international journal of medicine) dedicated a full issue to the publication of articles on social accountability in 2011 (6). Based on the definition of the World Health Organization (WHO), social accountability is a requirement in medical universities to direct education, research, and services toward the health priorities of the community, region, or nation (7).

To be socially accountable, medical schools should adopt ten strategies. The first strategy is ‘addressing the current and forthcoming health needs and challenges of the community’ (8); therefore, predicting the health needs of the community is an operational solution for medical schools to be socially accountable (9). Training of efficient specialists is one of the most important tasks of medical schools, so that students should not only acquire the knowledge of diseases and disease diagnosis during their studies, but they must also learn practical skills to be able to manage various patients after graduation (10, 11). Therefore, training of medical students should prepare them as skilled specialists after graduation, so that they could comprehend the needs of the community, solve personal and social issues, and modify their skills based on the changes in the community and medicaladvancement (12, 13).

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The ultimate goal of educating medical professionals is to improve the physical, mental, and social status of the community members (14). However, concerns have been raised in recent years regarding the fact that physicians are not adequately prepared to address the expectations of the community, and reports suggest that general practitioners are not prepared in clinical skills, communication skills, clinical pharmacology, and medical ethics at the beginning of their career (5).

Recent changes in learning theories, along with the changes in the needs of the community to which medical graduates must be accountable, highlight the fact that the adoption of strategies for the quality improvement of medical education curricula is inevitable (15). According to the literature, despite the implementation of family physician programs, there is a substantial gap between theoretical and practical training of general practitioners as compared with the expectations of the community of family physicians (16). For medical schools to be accountable of the needs of their covered community, not only the educational contents must be based on the health priorities of the community, but courses should also be integrated and presented in proper learning environments (classes, healthcare centers, clinics, and teaching hospitals), so that students could tangibly become familiar with the needs of the community, as well as the methods to overcome these issues (17).

Strasser and Lanphear believe that students should be provided with various educational situations, where they can recognize the issues and clinical diseases of community members and discuss social problems (18). Wen et al. consider three major strategies for increasing accountability to medical education curricula, including determining clear responsibilities regarding accountability to the needs of the community in medical schools, addition of community-based education on various levels of medical curricula, and following physicians after graduation (19). Furthermore, Yamani and Fakhari conducted a review study to classify the obstacles against accountability, which included the eight categories of curricula structure and delayed encounter of students with the health issues in the community, disproportionate educational contents with the needs of the community and attention to theoretical and clinical education, dominance of quantitative paradigms resulting in the lack of attention to important indices for accountable physicians, poor cooperation of universities and

community, lack of optional courses in social sciences, and work environment (3).

Considering the responsibility of medical graduates for the lives of people, medical education is of paramount importance, and therefore, attempts should be made to enhance the quality of medical education systems (20). According to Rezaeian, accountable medical schools are those where the importance of modifying educational, research, and service provision contents are primarily oriented by the health priorities of the covered community in accordance with ethical principles (17). In this regard, Shieh et al. performed a study and introduced the indices of social accountability in the medical schools of the country as four main dimensions (organization and performance, educational activities, research activities, and participation in healthcare service provision) and 58 indices (21).

Today, modification of medical education curricula based on the accountability to the needs of the community has been extensively studies (17). In Iran, some programs have been implemented to train responsible physicians; however, the efficacy of these programs has not been assessed properly. To assess the degree of social accountability in medical education curricula, proper instruments must be developed. Attempts in this regard have mostly been focused on defining indices and dimensions for the social accountability of medical schools rather than designing reliable instruments for the evaluation of educational curricula. Therefore, the present study aimed to develop a proper instrument for the evaluation of the curriculum of clinical medicine in terms of social accountability and assess its face validity, content validity, and reliability. The most important value of this instrument is providing a clear image of the current status of general clinical medicine curricula in line with social accountability. Moreover, the instrument could be used as a constant interventional monitoring tool by medical departments, professors, and policymaker.

Materials and Methods

This combined study aimed to develop an instrument in two qualitative and quantitative sections and was conducted in 2015 to design and validate an instrument for the evaluation of the curriculum of clinical medicine in terms of social accountability at Tabriz University of Medical Sciences, Iran.

First Stage

Using qualitative methods, semi-structured interviews were conducted with the experts and specialists of educational planning,

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medical education, and community medicine based on qualitative content analysis. Considering the objectives of the research, 14 professors were selected via purposive sampling and enrolled in the study for the collection of enriched data. Data collection was performed in order to determine the features of the elements of medical education curricula based on the social accountability approach and verification of the dimensions and items.

Second Stage

Based on the obtained data in the first stage and extensive study of credible scientific references relevant to the research subject, articles published on instrumentation, and papers on the evaluation indices of the curricula of general medicine based on the social accountability approach. In addition, literature search was conducted in databases such as Google Scholar, PubMed, Iran Medex, Elsevier, Springer, and ERIC using keywords such as social accountability, medical education, clinical teaching, and curriculum.

After determining the dimensions and items of the instrument, the collected data were reviewed by a panel of authors to integrate, eliminate or modify some items. Finally, the initial instrument of the assessment of the clinical medicine curriculum in terms of social accountability was developed with 55 items and scored based on a five-point Likert scale.

Third Stage

For the validation of the instrument, its validity and reliability were measured. In addition, face validity and content validity were assessed using quantitative methodology, and the reliability of the instrument was confirmed using Cronbach's alpha. Validity determines the extent to which an instrument could measure a specific parameter. Face validity defines the proper appearance of the instrument for the measurement of a specific construct (22).

In this study qualitative and quantitative methods were used to determine the face validity of the instrument. In the qualitative method, five professors of medical education evaluated the instrument in terms of the proportionality and proper correlation of the items and dimensions with the words that reflected the concept in question (23). In the quantitative method, face validity was also used to verify the significance of each item, and the item impact method was utilized to eliminate the less significant items. In this process, 11 professors were asked to evaluate each item in the instrument and determine the

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significance based on a five-point Likert scale (totally significant: 5, significant: 4, moderately significant: 3, slightly significant: 2, not significant: 1). Afterwards, the impact score of each item was calculated using the following formula:

Impact Score=Frequency (%) ×Importance

In the mentioned formula, frequency is the percentage of the participants who evaluated the item and importance represents the mean response of the participants to the options of the importance of each item.

To confirm the face validity of each item, the impact score had to be more than 1.5. Content validity determines the extent to which an instrument contains proper items for the measured construct, which appropriately covers the construct. Content validity is determined based on expert opinions (5-15 experts recommended generally) (22). To measure the content validity of the instrument in the present study, qualitative and quantitative methods were used. In the qualitative analysis of the content, 5 faculty members of medical education and community medicine provided feedback, and they were asked to closely study the instrument in terms of the coverage of the concept and its dimensions by the instrument, so that they could provide their written suggestions and modifications extensively (23).

In the quantitative assessment of content validity, the content validity ratio (CVR) and content validity index (CVI) were used. Initially, the objectives of the instrument and operational definitions on the contents of the items were explained to 11 experts in medical education, and they were asked to assess each item based on a three-point Likert scale (essential, useful but not essential, not essential). Afterwards, CVR was calculated using the following formula (24):

$$\mathbf{CVR} = \frac{\mathbf{n_E} - \boldsymbol{N/2}}{\boldsymbol{N/2}}$$

In the mentioned formula, n_E is the number of the experts who selected the option 'essential', and N denotes the total number of the experts. Based on Lawshe's table, the items with the CVR of >0.59 (according to the feedback of 11 experts) were accepted in the present study (25).

To determine the CVI, we used the method proposed by Waltz and Bausell. To do so, the instrument was provided to the panel of experts again, so that they would comment on each item based on 'relevance', 'clarity', and 'simplicity' and score the items based on a four-point Likert scale (e.g., 'relevance': not relevant=1, moderately relevant=2,

relevant=3, and totally relevant=4) (23). The following formula was used to determine the CVI for each item:

$$CVI = \frac{\text{Number of specialists who agrees with grades 3 and 4}}{\text{Total number of specialists}}$$

In this method, items with the score of 0.79 were appropriate, those scored 0.70-0.79 required modification, and items scored less than 0.70 were unacceptable (26).

At the end of this stage, reliability of the instrument was assessed. Reliability indicates the extent to which the repeated use of an instrument under identical circumstances could yield similar results (23). An instrument is reliable when it reflects scores accurately and without error (22). A reliability coefficient of >0.70 is acceptable, while the coefficient within the range of 0.85-0.95 are preferred (27). In the current research, the reliability of the instrument was assessed using internal consistency and Cronbach's alpha with the participation of 30 medical graduates.

Results

In the first and second stage of the research, the initial instrument was developed with 4 dimensions (objectives, contents, teaching-learning methods, and evaluation) and 55 items that were scored based on a five-point Likert scale (very high, high, low, and very low).

In the third stage, the instrument was validated. The impact score of all the items was more than 1.5. In 11 items (6, 13, 16, 24, 25, 26, 32, 35, 42, 52, and 53), CVR was lower than the values in Lawshe's table for 11 experts (0.59); these items were eliminated due to the low scores. Based on the comments of the experts in this stage and considering the objectives of the instrument and developed contents for the items, some items overlapped, four of which (2, 11, 19, and 34) were eliminated. Afterwards, the 40-item instrument was provided to the panel of experts again to measure CVR, and no items were eliminated at this stage. The total score of CVR in the 40-item instrument was estimated at 0.80. Furthermore, CVI was calculated to be 0.70-0.79 for three items (12, 23, and 44); after the modification of these items, CVI of all the items was >0.79 (total: 0.91).

The ratio of CVR to CVI for each item of the 40-item instrument is presented in Table 1. To determine the internal consistency of the 40-item instrument, the Cronbach's alpha was used, which was estimated at 0.97 (Table 2).

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Table 1: Content Validity Ratio (CVR) and Content Validity Index (CVI) after modification and revision of the tool

Domains	Items	CVR	CVI
Objectives	1) Designing a patient care plan considering physical, mental, social and spiritual dimensions.	1	0.91
	2) Assess and determine the health status of the individual and the population covered.	0.82	1
	3) Recognition and control of risk factors for health of individuals and society (such as cigarettes, drugs, etc.).	0.82	0.91
	4) Effective role in the design, implementation and evaluation of health interventions at the individual and population levels covered.	0.82	0.91
	5) Participation in appropriate social activities and teamwork with other health professions	0.64	0.82
	6) Common diseases education, epidemiological transition of disease, changes in disease burden in the community.	0.82	0.91
	7) Effective communication skills with patients and their companions and colleagues.	0.82	1
	8) Identify the causes of diseases and factors affecting their prognosis.	0.64	0.82
	9) The ability to provide essential education for healthy lifestyle and personal care and community care.	0.82	0.82
	10) Feeling responsible for the health of the community and trying to improve their health.	0.82	1
	11) Commitment to the observance of principles, standards, medical ethics and professional ethics	0.82	0.91
Content	12) Functioning in accordance with Islamic standards and medical ethics, respect for the values and culture of patients.	0.82	0.91
	13) Understanding the behavioral, social and medical ethics sciences depending on local needs and traditions.	0.82	0.82
	14) Health priorities and health issues of the country, region and the world.	0.82	0.91
	15) Management of health systems (group collaboration, compliance with priorities and priorities).	0.82	1
	16) General physician functions at different levels of referral.	0.64	1
	17) Improve critical thinking skills and problem solving to deal with clinical issues.	0.82	0.82
	18) A set of duties for a physician for independent medicine in the real environment.	0.64	1
	19) Identify and improve the health status of the groups of risk and the underserved in the community.	1	1
	20) Preventive care, diagnostic treatment and rehabilitation of diseases.	0.82	0.91
	21) Training of current practice skills in community health centers.	1	1
	22) Integrating clinical content with the following areas: community, prevention and promotion of health.	0.82	0.91
	23) Clinical decision-making and clinical reasoning.	0.82	1

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Continiue of Table 1: Content Validity Ratio (CVR) and Content Validity Index (CVI) after modification and revision of the tool

Teaching and Learning Methods	24) Providing active participation of students in teaching clinical sciences through question - answer and group discussion.	0.82	0.91
	25) Use community-based education and outpatient medical education in clinical education.	0.82	0.82
	26) Use of small group discussion in clinical education (seminars, free discussion, etc.).	0.82	0.91
	27) Using teaching and learning methods with a multidisciplinary approach to understanding and solving important health problems.	0.82	0.82
	28) Using simulation teaching methods and clinical demonstration-case presentation in different dimensions.	0.64	0.82
	29) Special emphasis on education and problem-based learning	0.82	0.91
	30) Patient communication skills training, and interpersonal interactions in the "role play" and "interview view".	0.82	0.91
	31) The curriculum includes a clinical course, clinical pathology conference and conferences.	0.82	0.91
	32) Ability to learn the necessary elements for serving at care levels (prevention, treatment and rehab).	0.82	0.91
Assessment	33) Emphasis on comprehensive assessment of students at all three levels of care (prevention, treatment, and rehabilitation levels).	0.82	0.91
	34) Multi source feedback (MSF) method (feedback from master, peers and patient or family).	0.64	0.82
	35) Designing theoretical tests for the common diseases of Iran and their epidemiological information.	0.82	1
	36) Emphasizing practical tests for acquiring the skills needed to care for patients in health centers.	1	1
	37) Valuation based on students' performance in the real work environment.	1	0.91
	38) Emphasis on learning the skills of thinking, problem solving, clinical decision making and clinical reasoning in the evaluation.	0.82	0.91
	39) The existence of a mechanism for monitoring and evaluating student performance in the management of health systems.	0.64	0.91
	40) Assign a part of the assessment score to participation in teamwork, research, and longitudinal projects.	0.64	0.82

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Table 2: The reliability of the designed tool using the Cronbach Alpha coefficient

Domains	Items	Cronbach Alpha Value
Objectives	11	0.94
Content	12	0.93
Teaching and Learning Methods	9	0.92
Assessment	8	0.91
Total	40	0.97

Discussion

The present study was the first in Iran to develop and validate an instrument for the evaluation of the curriculum of clinical medicine in terms of social accountability. According to the reviewed domestic and foreign studies, it seems that no such instruments have been developed with a similar purpose to that of the current research. Previous studies in this regard have mainly focused on the general concepts and indicators of social accountability in the curricula of clinical medicine (28-32). As a result, our instrument cannot be compared with the previous findings in this regard.

In the present study, a valid and reliable instrument was developed to evaluate the current status of the curriculum of general clinical medicine with adequate details and complete statements. To this end, a methodological design was applied to develop an instrument consisting of 4 dimensions and 40 items. In addition, a five-point Likert scale was considered for the instrument (very high, high, moderate, low, and very low) in order to increase the objectivity and accuracy of the scoring system (33).

The dimensions in the instrument were objectives, contents, teaching-learning methods, and evaluation, which are inherent elements of educational curricula. In the dimension of objectives, the items were focused on developing healthcare plans based on physical, mental, and spiritual states of the patient, identification and control of health risks in the individual and community, teamwork, training on common diseases, communication skills, diseases etiologies, training on healthy lifestyle and care techniques, sense of responsibility for the

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health of community members, and adherence to the ethical and professional principles of medicine. These items were in line with the results obtained by Emadzadeh et al. regarding the evaluation of the curriculum of general medicine in order to address social accountability in Mashhad University of Medical Sciences (Iran); in the mentioned study, 38 items were approved (28).

In the dimension of contents, the items were focused on Islamic and ethical principles, recognition of behavioral sciences, management of healthcare systems, duties of the physician in referral, development of critical thinking and problem-solving skills, medical practice in actual settings, improving the health status of underprivileged populations, preventive, diagnostic, healthcare and rehabilitation care, integration of clinical contents with the community settings, disease prevention and health promotion, and training on clinical decision-making and inference.

In a research performed in the University of Dundee (Scotland), which aimed to analyze the curriculum of medicine at the school of medicine, the findings indicated that the educational contents must consist of a clinical dimension (clinical knowledge and skills and critical thinking), health dimension (individual, social, cultural, preventive and promotional health measures and research), lifelong learning (to encounter emergencies and independent physicians), and leadership (management and leadership abilities, teamwork, communication and problem-solving skills) (29). These items are in line with the contents of the current research.

In the dimension of teaching-learning methods, the items were focused on community-based teaching methods, outpatient training, role-playing, and interview observation. In the dimension of evaluation, the items were focused on the necessity of the comprehensive evaluation of students on three levels of care (preventive, treatment, and rehabilitation), teamwork and longitudinal projects, thinking skills, problem-solving, clinical decision-making, and clinical inference. Teaching-learning methods and evaluation techniques that were mentioned in the items of these dimensions are in congruence with the results of the previous studies on social accountability in general medicine curricula (29-32).

Validation of the instrument in the present study was performed using face validity and content validity. In the qualitative assessment of face validity, the comments provided by the panel of experts were applied thoroughly.

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In the quantitative face validity, the impact score of the items was more than 1.5 in all the cases, which is considered appropriate. To determine content validity, we initially applied the comments of the experts qualitatively. In the quantitative content validity assessment, CVR was more than 0.59 for each item and 0.80 for the entire instrument, which were considered acceptable. Furthermore, CVI was more than 0.79 for each item and 0.91 for the entire instrument, which were considered appropriate.

Polit and Beck recommend an average CVI of 0.90 as a standard value (34). Pasargadi et al. conducted a study in the medical universities affiliated to the Ministry of Health and Medical Education in Tehran (Iran) in order to develop an instrument for the evaluation of the general performance of nursing students. In the mentioned research, mean CVI was estimated at 0.94 (35). In another study, Abdi Shahshahani et al. developed and validated an instrument for the evaluation of the PhD course in the health fertility specialty in Iran based on the CIPP model at Isfahan University of Medical Sciences; according to the findings, mean CVI was 0.90 (36). With regard to the reliability of the instrument was confirmed at the Cronbach's alpha of 0.97. Similarly, Pasargadi et al. used the Cronbach's alpha coefficient to confirm the reliability of their instrument at 0.99 (35). Moreover, in the study by Abdi Shahshahani et al., the Cronbach's alpha coefficient was reported to be higher than 0.90 in all the groups (36).

The most important limitation of the present study is the inability to generalize the findings. Considering that the stages of developing and validating the instrument were performed with the cooperation of the professors at Tabriz University of Medical Sciences, the findings could not be generalized to the other areas in Iran. Therefore, it is recommended that further studies be focused on this issue, and necessary modifications be made in terms of social accountability in other universities.

Conclusion

The instrument developed in the current research aimed to evaluate the status of the curriculum of general clinical medicine in terms of social accountability with 4 dimensions and 40 items. According to the results, all the scores and calculated values regarding the validity and reliability of the instrument were acceptable, and the instrument has proper validation features.

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Therefore, it could be used for the evaluation of the status of the (implemented) curriculum of clinical medicine in terms of social accountability.

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